Book Reviews

Lyell's Principle

Uniformity and Simplicity. A Symposium on the Principle of the Uniformity of Nature, Nov. 1963. CLAUDE C. ALBRITTON, JR., Ed. Geological Society of America, New York, 1967. x + 99 pp., illus. Paper, $4.50. GSA Special Papers, No. 89.

This short book consists of four fine essays that examine the philosophical underpinnings of classical geology. Commonly summarized by the slogan "The present is the key to the past," the Principle of Uniformity has come to mean to some a substantive statement about present and past configurations of the earth, and to others only the logic and method by which geologists attempt to reconstruct the past. Modern viewpoints in historical geology differ considerably from those embodied in the Principle with which Charles Lyell successfully launched the science of geology in 1830. Where does this leave Uniformity today? This question set the tone for the 1963 Geological Society of America symposium at which these papers were originally presented.

The first two essays are excellent discussions of the historical background of Uniformity: M. K. Hubbert's treats the entire gamut of uniformitarian thought from its inception to the present day, and L. G. Wilson's focuses on the work of Charles Lyell. Both provide a great many insights not generally encountered. Nurtured by the vigorous descriptive field studies that characterized the geology of the 1820's, Lyell's Uniformity implanted the concept of geologic time in Western scientific thought. However, the accompanying idea of perpetual cycles contravened the later developed laws of thermodynamics. In this light it is ironic that estimates of the duration of geologic time made by the early uniformitarians were much closer to the truth than were the later estimates of Lord Kelvin, a founder of modern thermodynamics. But Kelvin, of course, knew nothing about radioactivity. The Uniformity of Lyell achieved its purpose—to destroy the constraints imposed by assuming that Divine Providence interferes with geologic events. Inasmuch as this function is no longer needed, that which remains is only a vaguely formulated principle whose chief value lies in its historical interest.

N. D. Newell's "Revolutions in the history of life" departs from the philosophical tack and reviews the evidence for the abrupt appearances and disappearances of important animal groups in the geologic record. He suggests that this evidence supports the 1815 findings of Cuvier, who attributed abrupt appearances of new faunas to sudden migrations, much better than it does the 1859 ideas of Darwin, who felt that invisible breaks in the strata had destroyed much of the record of continuous gradual change.

In Newell's view a "revolution" consists of two phases: (i) an epoch of extinction accompanied or followed by (ii) an epoch of adaptive radiation. The chief problem is to explain extinctions, since these provide the trigger. Here Newell avoids the exotic hypotheses that seem to be in vogue; instead he favors the conservative explanations of migrations, climate, and paleogeographic changes, particularly episodes of submergence and emergence. He suggests that emergences of continents like those at the close of the Permian and Cretaceous periods provided large areal changes in terrestrial and shallow marine environments and that mass extinction resulted.

These hypotheses need further testing. Support must come from detailed biostratigraphic studies throughout broad areas. These in turn must be supplemented by the thorough working out of timetables of physical events for an understanding of the total historical picture.

Nelson Goodman's brief article entitled "Uniformity and simplicity" inquires into the meaning of uniformitarianism for earth science today. In Goodman's view, Uniformity is not simply the affirming of the constancy of natural laws. We write the laws, and if nature behaves according to them, this means only that we have succeeded in describing its behavior. From this, Goodman concludes that the first step toward clarifying the Principle of Uniformity is to transform it into the Principle of the Simplicity of Theory.

Faced with a choice among equally probable hypotheses, scientists choose the simplest. Why? Not merely for the sake of elegance, but because science consists of organizing and systematizing facts—in short, of simplifying. Does this mean that nature tends to obey the simplest laws? Not at all. Nature only follows those laws that have not yet been violated. Some are, in fact, exceedingly complex. It is we who aim at simplicity (and hope for truth), and it follows that the simplest surviving theory should be tested first and abandoned only when it proves false. Goodman concludes in the tone of the symposium that "The Principle of Uniformity dissolves into a principle of simplicity that is not peculiar to geology, but pervades all science and even everyday life."

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Crime and Reason

The Trial of the Assassin Guiteau. Psychiatry and Law in the Gilded Age. CHARLES E. ROSENBERG. University of Chicago Press, Chicago, Ill., 1968. xviii + 289 pp., illus. $5.95.

Rosenberg began his study of the assassin of President Garfield in 1960. After the death of President Kennedy in 1963, when it appeared that the book might be considered timely rather than scholarly, the author almost gave up the project. He was prevailed upon to persist, and two more bizarre events with which the long-awaited publication coincided have given the work relevance to the headlines beyond the worst fears of its author.

Charles J. Guiteau was born in 1841, the son of a religious fanatic. Guiteau, the son, did not smoke or drink, and he was fervently, if confusedly, religious. He also used prostitutes, cheated landladies, and generally welshed on debts and defrauded whenever he could. By profession he was a lawyer, chiefly a bill collector (frequently pocketing his collections without notifying the creditor). He roamed